STATEMENT OF WORK
FOR THE MAINTENANCE
OF THE
WATER TREATMENT SYSTEMS
FOR HIGH VOLUME AIR CONDITIONING / HEATING SYSTEMS
ON
DOVER AIR FORCE BASE

04/13/01

Statement of Work for HVAC Water Treatment

1. The intent of the following specifications is that the contractor shall furnish chemicals and service program to control scale, corrosion, slime and algae in the condensers and cooling towers servicing the refrigeration systems and closed loop heating and cooling systems, plus water softeners.

2. The buildings, which are included in the request for bid, are listed in Appendix A of this request.

3. Shipping - All quotations given in this request shall be F.O.B. Dover Air Force Base. Material will be ordered for delivery at specific loading dock addresses.

4. Material Safety Data Sheets - Three (3) sets of MSDS's shall accompany this request for quotation. The bidder will ensure MSDS accompanies all first time orders and will operate a 24-hour, 7 day per week emergency phone number which can be called for emergency information regarding chemical spills and/or accidents.

5. All products furnished by the contractor shall meet all Federal and State regulatory requirements.

6. Any relocation of chemical feed points and/or purchase of test kits and any other changes required to meet the bidder's proposed program needs, shall be provided and installed by the contractor.

I. SERVICE REQUIREMENTS

A. CONTRACTOR GENERAL SERVICE REQUIREMENTS

1. OPERATOR TRAINING PROGRAM: The successful contractor shall provide one on-site training session at Dover Air Force Base for all Base Civil Engineering personnel who are in need of the knowledge of chemical treatment and the systems monitored at Dover Air Force Base. Contractors shall submit with the proposal, a detailed plan on what information will be included in the operator-training program.

2. PERSONAL SERVICE ON-SITE: The successful contractor shall provide Dover Air Force Base with certified professionals to provide regular on-site service. The service shall be conducted a minimum of eight (8) hours per week and each system shall be tested at least every 2 weeks. The purpose of these service visits is to prevent potential problems that will reduce equipment efficiency or result in equipment damage. Response time for all of the contractor's representatives must be within 30 minutes of notification. The following services shall be provided on each visit but are not limited to:

a. On-site testing and analysis
b. Operator training and updating
c. System log review and program adjustments
d. Efficiency analyses
e. Microbio testing and recommendations

The approved contractor shall have the ability to test the level of microorganisms in each system on-site That have the possibility of microorganisms. Provide Maintenance Engineering personnel with this information during the service visit. The contractor shall report any problems to the system or system components to Maintenance Engineering personnel for action during the site visit.

3. TEST AND ANALYSIS: The successful contractor must be able to do the following analysis at any given time:

a. Corrosion coupon analysis
b. Microbiological analysis
c. Water analysis
d. Deposit analysis
e. Metallographic failure analysis

4. CHEMICAL TESTING AND MONITORING PROGRAM: The contractor shall submit with the proposal written procedures for all control tests including a description of the test, test equipment and chemical reagents to be used. Also, include the test frequency and duration of each test. In addition, the contractor will provide samples of the log requirements to be used by Civil Engineering to track program parameters.

B. PRICE AND RESULTS ASSURANCE

1. PRICE QUOTATION: The contractor must guarantee that the delivered price per pound in the appropriate size and quantity will not exceed the quoted price for the contract period.

2. RESULTS ASSURANCE: It is expected that the applications of the contractor's recommended program in strict accordance with instructions will result in clean heat transfer surfaces and low corrosion rates. These criteria will be monitored by the contractor with:

a. Corrosion coupon monitoring with rates not to exceed 2.0 MPY (mils per year) in mild steel and 0.5 MPY in non-ferrous metals. Contractor shall provide mild steel and copper coupons for each system. These coupons shall be pre-weighed and registered by the contractor's lab prior to sending them to Dover Air Force Base. The coupons will be sent to the lab at 90-day intervals for analysis. The contractor shall monitor Corrosion coupon for each system.

II. CHEMICAL TREATMENT PROGRAM REQUIREMENTS

A. SCALE AND CORROSION CONTROL

1. CHEMICALS: The chemical treatment shall be a single multifunctional liquid product. The blend of active ingredients shall include at least:

a. Combination of AMP and PBTC phosphates
b. Tolytriazole
c. Organic surfactant (Biodispersant)

The final blend shall be alkaline, the chemical shall be able to withstand high heat transfer, chlorine, and calcium hardness to 900 ppm, M-alkalinity of 500 ppm, and bulk water temperatures vary according to building application. While these are not normal operating characteristics there are system upsets that demand an adherence to these requirements. Product bulletins, which outline capability of meeting these requirements, shall be submitted with the proposal. No treatments containing heavy metals or acidic pH levels will be considered

The contractor agrees to maintain the following treatment level:

4.0 to 8.0 PPM PBTC (ortho-phosphate) for $CaCO_3$ stabilization and iron protection
> 1.0 PPM Tolytriazole for yellow metal corrosion inhibitor
Polymer Biodispersant for clean heat transfer surfaces, by decreasing microbiological fouling

2. APPLICATION: The chemicals will be introduced into the system by existing proportional pumps adjusted to maintain a level of chemical measured in ppm of material in water.

2. SERVICE PROGRAM: The successful contractor shall provide written procedure indicating concentration of chemical and method of testing to verify that concentration.

a. Tests performed should include the following:
    1. Conductivity of both city water make-up and condenser water to calculate cycles of concentration
    2. pH
    3. Calcium hardness
    4. Total Alkalinity
    5. Phosphate
    6. Iron
    7. Copper
    8. Total bacteria

b. No bulk storage allowed on Dover AFB, DE.

B. BIOLOGICAL CONTROL PROGRAM (Cooling Towers)

1. CHEMICALS: The chemical treatment program shall consist of a liquid, non-oxidizing, non-ionic isothiazoline based biocide and a liquid, oxidizing, stabilized bromine biocide. The microorganisms must be kept below 100,000 organisms per ml. Cationic biocides will not be considered. The stabilizer will stabilize the bromine and provide high resistance to mechanical stripping, low odor at application and allow a continuous 0.25 ppm free residual as bromine (by DPD chlorine test method) for 24 to 48 hours. The stabilizer will be incorporated in the same container as the bromine source. Commodity products such as sodium bromide and bleach will not be considered.

2. APPLICATION: The chemical treatment will be applied by "slug" feeding at the intervals recommended by the contractor by use of an eduction system to eliminate handling of the chemical.

3. SERVICE PROGRAM: The contractor shall submit written procedures for testing the effectiveness of the microbiocide program. The field test must be done by Contractor personnel once per week on all systems and be accurate from less than 100,000 organisms/ml to 10,000,000 organisms/ml. The test results must be available within 1/2 hour and the actual procedures must not take more than 5 minutes

4. Biocide feed container will be allowed in Mech. Room.

C. CLOSED LOOP TREATMENT

1. CHEMICALS: The chemical treatment program to be used in each facility will vary from building to building, based on present loop condition, temperature, treatment currently used and make-up to the system. The technologies that will be acceptable to Dover Air Force Base in general are as follows:

a. Nitrite/Molybdate combination which includes polyacrylate dispersants, Tolytriazole and a pH buffer.
b. Propylene glycol(food grade) –10 degrees F burst protection

2. APPLICATION: The chemicals will be applied by "slug" feeding through a pot feeder based on an as needed basis as determined by the successful contractor.

3. SERVICE PROGRAM: The contractor shall conduct a survey of Dover Air Force Base closed loops to identify the need for back-flow preventers, pot feeders and present loop conditions. The contractor to ensure the loops are maintained at turbidities below 100 NTU.

The contractor shall identify any system that exceed a corrosion rate above 0.1 MPY on copper and mild steel coupons and will furnish testing and recommendations. In addition, the following minimum chemical levels will be maintained:

a. Nitrite/Molybdate Program will have 400 ppm as NO_2 in chilled loops and 600 PPM as NO_2 in hot loops. Molybdate will be maintained at 60 ppm as Mo in chilled loops and 80 ppm as Mo in hot loops. For dual temperature systems maintain higher level.

D. WATER SOFTNERS

1. CHEMCALS: The chemicals to be used for water softener treatment will be solar salts.

2. APPLICATION: The chemicals will be administered via brine tank.

3. SERVICE PROGRAM: The contractor shall test the water to ensure that hardness levels are less then 1 PPM as CaCO3. Test results and recommendations shall be furnished by the contractor to ensure that the water is maintained at the recommended parameters.